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EXAMINER	
SCHINDLER, DAVID M	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 04/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	10/621,811	MCDEARMON ET AL.	
	Examiner	Art Unit	
	David Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/14/03, 2/17/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. It is noted that the priority date for provisional application number 60/396,390 in the Oath appears to be incorrect. The date should be July, 17, 2002, but is instead recited as July 17, 2003.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 1) degrading surface is an axial face located on a rotating component of Claim 5, 2) the combination of the claim features of Claims 7 and 19, 3) the notch in a circular ring, wherein the notch is aligned with the step in the degrading surface of Claims 9 and 21, 4) the degrading surface covers less than the entire 360 degree surface of a rotating component of Claims 11 and 23, 5) the combination of the claim features of Claim 13, 6) the degrading surface is an axial face of the rotating component of Claim 17, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to because 1) reference numbers 8 and 9 of Figure 2 are not disclosed in the specification, and 2) the end piece on the far left side of Figure 2 is not labeled. Figure 3 has this piece labeled with reference number 12, 3) The extension (13) of Figure 2 and the rotating shaft (11) of Figure 3 appear to be the same thing, and as such it is not clear what the difference is, 4) The radial surface (6) of Figure 2 does not appear to include a degrading surface, 5) The inventor name, docket number, and other information at the time of the drawing pages should not be included on the drawing pages. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: Absolute Angular Position Sensing by way of a Degrading Surface.

4. The disclosure is objected to because of the following informalities:

It is not clear what is meant by the term "step" on line 23 of Page 8.

It is unclear how the first linear position sensor is determining the position of the rotating component as stated on lines 19-20 of page 11.

It is unclear how the second linear position sensor is determining the position of the rotating component as stated on lines 21-22 of page 11.

Appropriate correction is required.

Claim Objections

1. Claims 1-12, 19,20, and 21 are objected to because of the following informalities:

As to Claims 1-12,

The preamble is non-descriptive. It is recommended to use "A device for determining an absolute angular position of a rotating component."

As to Claim 7 and 19,

The phrase "the incline of the first degrading surface" on line 3 of Claims 7 and 19 lacks antecedent basis.

The phrase "the incline of the second degrading surface" on lines 3-4 of Claims 7 and 19 lacks antecedent basis.

The relationship between the rotating component and the second degrading surface on lines 2-3 and lines 8-9 of Claims 7 and 19 is unclear.

As to Claim 8,

It is unclear how "A" is "the position of the rotating component as derived from the first signal" as stated on line 8. "A" appears to be the output of the first sensor. See Line 1 of Page 12.

It is unclear how "B" is "the position of the rotating component as derived by the second signal" as stated on lines 10-11. "B" appears to be the output of the second sensor. See Lines 1-2 of Page 12.

As to Claim 9,

The phrase "the step in the degrading surface" on line 2 lacks antecedent basis.

Appropriate correction is required.

As to Claim 19,

The preamble of appears to be incorrect as Claim 19 depends on the method Claim 14.

As to Claim 20,

The phrase "A = the position of the rotating component as derived from the first signal" on line 8 is unclear. Lines 1-2 show that "A" is a first signal of the first linear position sensor, not a position of the rotating component derived from the first signal.

The phrase "B = the position of the rotating component as derived by the second signal" on lines 10-11 is unclear. Lines 2-3 show that "B" is a second signal of the second linear position sensor, not a position of the rotating component derived from the second signal.

It is noted in for the above two objections for Claim 20 that "the position is derived from the formula" as stated on lines 3-4.

As to Claim 21,

The phrase "the step in the degrading surface" on line 2 lacks antecedent basis.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 12, 13-16, and 24 rejected under 35 U.S.C. 102(b) as being anticipated by Vaidya et al. (4,785,242).

As to Claim 1,

Viadya et al. discloses at least one linear position sensor (26) and at least one

degrading surface (42) wherein at least one signal generated by the at least one linear position sensor is used to derive an absolute angular position of a rotating component (38) ((Figure 5) and (Column 2, Lines 8-10) and (Column 2, Lines 19-24) and (Column 6, Lines 6-21)).

As to Claim 2,

Viadya et al. discloses the at least one linear position sensor is one of either a Hall-Effect sensor, a magnetoresistive sensor, an inductive sensor, a magnetic sensor (Column 9, Lines 23-25).

As to Claim 3,

Viadya et al. discloses the degrading surface is a radial outer surface located on the rotating component (38) (Figure 5).

As to Claim 4,

Viadya et al. discloses the at least one signal generated by the at least one linear position sensor is used to derive at least one of the speed of rotation of the rotating component and the amount of angular acceleration of the speed of the rotating component ((Column 3, Lines 64-68) and (Column 4, Lines 1-4) and (Column 6, Lines 40-49) and (Column 7, Lines 1-3) an (Column 7, Lines 12-15)).

As to Claim 12,

Viadya et al. discloses the at least one degrading surface is made from material that is at least one of ferromagnetic and magnetic ((Figure 5) and (Column 6, Lines 17-21)).

It is noted that "the second magnetic sensor senses ... variations in the second magnetic field as the wheel rotates" as stated on lines 17-20 of column 6. The wheel must therefore be made of either a ferromagnetic or magnetic field in order for the field to be created.

As to Claim 13,

Viadya et al. discloses providing at least one linear position sensor (26), providing at least one rotating component (38) having at least one degrading surface (42), positioning the at least one linear position sensor such that an air gap exists between the at least one linear position sensor and the at least one degrading surface (Figure 2), detecting at least one signal from the at least one linear position sensor (Column 6, Lines 40-43), the at least one signal being responsive to changes in the air gap between the at least one linear position sensor and the at least one degrading surface ((Figure 5) and (Column 2, Lines 19-24)), and using the at least one signal to derive the absolute angular position of the rotating component (Column 6, Lines 53-57).

As to Claim 14,

Viadya et al. discloses the at least one linear position sensor is one of either a Hall-Effect sensor, a magnetoresistive sensor, a giant magnetoresistive sensor, an inductive sensor, and a magnetic sensor (Column 9, Lines 23-26).

As to Claim 15,

Viadya et al. discloses he degrading surface is a radial outer surface of the rotating component (Figure 5).

As to Claim 16,

Viadya et al. discloses the at least one signal generated by the at least one linear position sensor is used to derive at least one of the speed of rotation of the rotating component and the amount of angular acceleration of the speed of the rotating component ((Column 3, Lines 64-68) and (Column 4, Lines 1-4) and (Column 6, Lines 40-49) and (Column 7, Lines 1-3) an (Column 7, Lines 12-15)).

As to Claim 24,

Viadya et al. discloses the at least one degrading surface is made from material that is at least one of ferromagnetic and magnetic ((Figure 5) and (Column 6, Lines 17-21)).

It is noted that "the second magnetic sensor senses ... variations in the second magnetic field as the wheel rotates" as stated on lines 17-20 of column 6. The wheel must therefore be made of either a ferromagnetic or magnetic field in order for the field to be created.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5, 6, 7, 11, 17-19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Hettlage (5,243,187).

As to Claims 5,

Vaidya et al. does not disclose the degrading surface is an axial face located on the rotating component.

Hettlage discloses the degrading surface (2) is an axial face located on the rotating component (1) (Figure 1) and (Column 4, Lines 28-31)).

It would have been obvious at the time of the invention to modify Vaidya et al. to include the degrading surface is an axial face located on the rotating component as taught by Hettlage in order to provide a high resolution absolute encoder which is distinguished by high reliability and vibration resistance (Column 2, Lines 23-31).

As to Claim 6,

Vaidya et al. discloses the signal generated by the at least one linear position sensor is used to derive at least one of the speed of rotation of the rotating component and the amount of angular acceleration of the speed of the rotating component ((Column 3, Lines 64-68) and (Column 4, Lines 1-4) and (Column 6, Lines 40-49) and (Column 7, Lines 1-3) an (Column 7, Lines 12-15)).

As to Claims 7 and 19,

Vaidya et al. discloses there is a first linear position sensor (26), a first degrading surface (42), a second linear position sensor (16), and the first linear position sensor being located to detect a change in a first air gap between the first linear position sensor and the first degrading surface as the rotating component (38) is rotated ((Column 3, Lines 10-16) and (Figure 5)).

Vaidya et al. does not disclose a second degrading surface, the incline of the first degrading surface being opposite to the incline of the second degrading surface, and the second linear position sensor being located to detect a change in a second air gap between the second linear position sensor and the second degrading surface as the rotating component is rotated.

Hettlage discloses a second degrading surface (3), the incline of the first degrading surface (2) being opposite to the incline of the second degrading surface (Figure 2), and the second linear position sensor (5) being located to detect a change in a second air gap between the second linear position sensor and the second degrading surface as the rotating component is rotated ((Figure 2) and (Abstract, Lines 3-11) and (Column 3, Lines 4-9)).

It would have been obvious at the time of the invention to modify Vaidya et al. to include a second degrading surface, the incline of the first degrading surface being opposite to the incline of the second degrading surface, and the second linear position sensor being located to detect a change in a second air gap between the second linear position sensor and the second degrading surface as the rotating component is rotated as taught by Hettlage in order to determine a rotation angle from the output signals of the sensors (Column 2, Lines 38-42).

As to Claims 11 and 23,

Vaidya et al. does not disclose the degrading surface covers less than the entire 360 degree surface of a rotating component.

Hettlage discloses the degrading surface (2) covers less than the entire 360 degree surface of a rotating component (1) (Figure 1).

It would have been obvious at the time of the invention to modify Vaidya et al. to include the degrading surface covers less than the entire 360 degree surface of a rotating component as taught by Hettlage in order to have degrading surface (saw-tooth shaped) regions ((Figure 1) and (Column 2, Lines 49-52)).

As to Claim 17,

Vaidya et al. does not disclose the degrading surface is an axial face of the rotating component.

Hettlage discloses the degrading surface (2) is an axial face of the rotating component (1) (Figure 1) and (Column 4, Lines 28-31)).

It would have been obvious at the time of the invention to modify Vaidya et al. to include the degrading surface is an axial face of the rotating component as taught by Hettlage in order to provide a high resolution absolute encoder which is distinguished by high reliability and vibration resistance (Column 2, Lines 23-31).

As to Claim 18,

Vaidya et al. discloses the signal generated by the at least one linear position sensor is used to derive at least one of the speed of rotation of the rotating component and the amount of angular acceleration of the speed of the rotating component ((Column 3, Lines 64-68) and (Column 4, Lines 1-4) and (Column 6, Lines 40-49) and (Column 7, Lines 1-3) an (Column 7, Lines 12-15)).

6. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Hettlage (5,243,187) and in further view of Lewis et al. (4,982,156).

Vaidya et al. discloses the first linear position sensor (26) generates a first signal and the second linear position sensor (16) generates a second signal ((Column 6, Lines 40-43).

Vaidya et al. in view of Hettlage discloses as explained above.

Vaidya et al. in view of Hettlage does not disclose the position of the rotating component is derived from the formula P=(A-B)/(A+B), where P=the position of the rotating component, A=the position of the rotating component as derived from the first signal, and B=the position of the rotating component as derived by the second signal.

Lewis et al. discloses the position of the rotating component is derived from the formula P=(A-B)/(A+B) ((Column 3, Lines 59-67) and (Column 3, Lines 14-16)), where P=the position of the rotating component (Column 3, Line 65), A=the position of the rotating component as derived from the first signal (Column 3, Lines 56-57), and B=the position of the rotating component as derived by the second signal (Column 3, Lines 57-59).

It would have been obvious at the time of the invention to modify Vaidya et al. in view of Hettlage to include the position of the rotating component is derived from the formula P=(A-B)/(A+B), where P=the position of the rotating component, A=the position of the rotating component as derived from the first signal, and B=the position of the

rotating component as derived by the second signal as taught by Lewis et al. in order to determine position of the moveable member (Column 3, Lines 61-63).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Hettlage (5,243,187) and Lewis et al. (4,982,156) and in further view of Suzuki et al. (JP04110727A).

Vaidya et al. in view of Hettlage and Lewis et al. discloses as explained above.

Vaidya et al. in view of Hettlage and Lewis et al. does not disclose a notch in a circular ring, wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component.

Suzuki et al. discloses a notch (Abstract, Constitution, Lines 1-3) in a circular ring (1), wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component (Abstract, Constitution, Lines 1-8).

It would have been obvious at the time of the invention to modify Vaidya et al. in view of Hettlage and Lewis et al. to include a notch in a circular ring, wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component as taught by Suzuki et al. in order to show the absolute position of a rotating component (disc) (Abstract, Purpose, Lines 3-4).

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Suzuki et al. (JP04110727A).

Vaidya et al. does not disclose a notch in a circular ring, wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component.

Suzuki et al. discloses a notch (Abstract, Constitution, Lines 1-3) in a circular ring (1), wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component (Abstract, Constitution, Lines 1-8).

It would have been obvious at the time of the invention to modify Vaidya et al. in to include a notch in a circular ring, wherein the notch is aligned with the step in the degrading surface such that the notch is used as a reference point to allow for a 360 degree range of motion of the rotating component as taught by Suzuki et al. in order to show the absolute position of a rotating component (disc) (Abstract, Purpose, Lines 3-4).

9. Claim 10 is 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Hettlage (5,243,187) and Lewis et al. (4,982,156) and in further view of Luetzow (2003/0112006).

Vaidya et al. in view of Hettlage and Lewis et al. discloses as explained above.

Vaidya et al. in view of Hettlage and Lewis et al. does not disclose the at least

one linear position sensor includes an ability to generate at least one signal corresponding to a temperature.

Luetzow discloses the at least one linear position sensor includes an ability to generate at least one signal corresponding to a temperature (Page 8, Left Column, Paragraph [0061], Lines 9-12).

It would have been obvious at the time of the invention to modify Vaidya et al. in view of Hettlage and Lewis et al. to include he at least one linear position sensor includes an ability to generate at least one signal corresponding to a temperature as taught by Luetzow in order to use the sensor as a temperature sensing device to monitor the ambient temperature (Page 8, Left Column, Paragraph [0061], Lines 14-16).

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidya et al. (4,785,242) in view of Luetzow (2003/0112006).

Vaidya et al. does not disclose the at least one linear position sensor includes an ability to generate a signal corresponding to a temperature.

Luetzow discloses the at least one linear position sensor includes an ability to generate a signal corresponding to a temperature. (Page 8, Left Column, Paragraph [0061], Lines 9-12).

It would have been obvious at the time of the invention to modify Vaidya et al. to include the at least one linear position sensor includes an ability to generate a signal corresponding to a temperature as taught by Luetzow in order to use the sensor

as a temperature sensing device to monitor the ambient temperature (Page 8, Left Column, Paragraph [0061], Lines 14-16).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat No. 4,746,859 to Malik which discloses first and second magnetic sensors that output signals indicative of the magnetic field intensity which is dependent upon the length of the first and second air gaps.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Schindler

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